Claims:

1. Method for dividing the bit rate of QPSK signals into at least two sub-channels having band width limited filters in the modulator and the demodulator, by means of splitting the spectrum of the QPSK signals, characterized by the following characteristics:

- Filtering of the QPSK signal by means of an ideal low-pass ($H_{[?]}$) in the modulator of a transmitter having a specific band width ($\omega_g$);

- Changing the band width by means of a Nyquist flank at the specific band width ($\omega_g$), without bringing about a change in the zero passages of the pulse responses at a multiple of $1/2f_g$ or $1/f_g$;

- Dividing the pre-filtered QPSK signal by means of two filter branches ($\boldsymbol{P}_1\boldsymbol{P}_1*$; $\boldsymbol{P}_2\boldsymbol{P}_2*$), into at least one purely real spectrum ($\boldsymbol{P}_1$), i.e. one purely real channel, and at least one purely imaginary spectrum ($\boldsymbol{P}_2$), i.e. one purely imaginary channel, by means of filters ($\boldsymbol{P}_1*$ and $\boldsymbol{P}_2*$) that form pulse former pairs,

whereby the divided QPSK signal is transmitted at half the bit rate $1/f_g$ in the filter branches;

- Modulating the divided QPSK signal with a sine carrier or a cosine carrier, in each instance;

- Transmitting the signal obtained in this manner at the receiver with demodulator;

- Dividing the received signal by means of at least two filter branches with a purely real transmission function ($\boldsymbol{P}_1$*) and a purely imaginary transmission function ($\boldsymbol{P}_2$*) by means of at least two filter branches ($\boldsymbol{P}_1\boldsymbol{P}_1$*; $\boldsymbol{P}_2\boldsymbol{P}_2$*), into at least two purely real spectra ($\boldsymbol{P}_1$) and into at least one purely imaginary spectrum ($\boldsymbol{P}_2$), by means of filters ($\boldsymbol{P}_1$* and $\boldsymbol{P}_2$*) that form pulse former pairs, whereby the divided signal is transmitted at half the bit rate $1/f_g$;

- Demodulation by means of modulation of the QPSK signals with a sine carrier or a cosine carrier.

2. Method as recited in claim 1, characterized in that the zero places of the pulse responses in the two filter branches ($\boldsymbol{P}_1$, $\boldsymbol{P}_2$, and $\boldsymbol{P}_1$* and $\boldsymbol{P}_2$*) lie at a multiple of $1/f_g$ and the transmitted bit rate lies at $1/f_g$, in each instance.

3. Method as recited in claim 2, characterized in that the purely imaginary transmission function ($\boldsymbol{P}_2$*) in the demodulator is generated with the root sign from the Nyquist flank of the ideal low-pass channel and by changing the sign (-).

4. Method as recited in one of the preceding claims, characterized by a steep Nyquist flank at ($\omega_g$).

5. Method as recited in claim 4, characterized in that the pulse responses of the filter pairs are multiplied by the factor $\sqrt{2}$ after the division into the upper and lower frequency range, with overlapping Nyquist flanks at $\omega/2$.

6. Method as recited in one of the preceding claims, characterized in that for an expansion to multi-carrier systems, the real and imaginary spectra are implemented, on the

demodulator side, by a low-pass filter ($P_1$) and subsequent modulation with equidistant cosine and sine carriers.

7. Method as recited in claim 1 or 6, characterized in that for an expansion to multi-carrier systems, the filter branches ($P_1$) in the modulator and/or demodulator have a root Nyquist flank at $\omega_g$, and the second filter branches ($P_2$) have a root Nyquist flank at ¼ $\omega_g$ and/or ¾ $\omega_g$, whereby the pulse responses of the filter branch ($P_2$) are established symmetrical around $\omega/2$ in the region of the filter branch ($P_1$).

8. Method as recited in one of the preceding claims, characterized in that a pulse response delivered by way of the cosine crest channel ($\boldsymbol{H}_c(\omega)$) at a bit rate $2f_g$ of an ideal low-pass is defined as two pulse responses of an ideal low-pass, multiplied by the factor ½, which are offset relative to one another by the time $1/2f_g$, and that the pulse response is scanned in the demodulator at the interval of $1/2f_g$, and offset by $1/4f_g$ as compared with the ideal low-pass, whereby the cosine crest channel ($\boldsymbol{H}_c(\omega)$) does not have any perpendicular flanks like those of an ideal low-pass (duobinary transmission).

9. Method as recited in claim 8, characterized in that the loss of 3 dB that occurs in the case of duobinary transmission with pre-coding and dual-path rectification is avoided by means of Viterbi decoding.

10. Method as recited in claim 7, 8, or 9, characterized in that the following functions

$$\sqrt{|H_s(\omega)|} = \sqrt{\sin \pi \frac{|\omega|}{\omega_g}}$$

are inserted on the transmitter side and/or the reception side, whereby a sine carrier is derived from a cosine carrier in the implementation of the filters, by means of modulation, and vice versa, in order to achieve a real transmission function and an imaginary one.

11. Method as recited in one of the preceding claims, characterized in that on the transmitter side, the scanning samples generated with the filters ($\boldsymbol{P}_1$ and $\boldsymbol{P}_2$) form a Hilbert pair and, on the reception side, the scanning samples of the reception-side filters ($\boldsymbol{P}_1$* and$\boldsymbol{P}_2$*) are interchanged in terms of their places.

12. Method as recited in one of claims 7 to 11, characterized in that the filter ($\boldsymbol{P}_1$) is one having a root sine frequency passage in the range $-\omega_g \ldots \omega_g$ and that the filter ($\boldsymbol{P}_2$) is implemented by means of multiplication with j sign($\omega$) and the reception filters correspond to the transmission filters, but interchanged.

13. Method as recited in one of claims 7 to 12, characterized in that in the first filter branch, a low-pass ($\boldsymbol{P}_1$) is provided, and in the second filter branch, a band pass ($\boldsymbol{P}_2$) is provided, and that the pulse responses in the filter branches ($\boldsymbol{P}_2 \bullet \boldsymbol{P}_2{}^*$) have a higher frequency than the pulse responses that belong to the product $P_1{}^2$ of the low-pass branches.

14. Method as recited in claim 7, 8, or 13, characterized in that the band pass ($\boldsymbol{P}_2$) in the second filter branch is implemented by means of modulation, and that the carrier lies outside of the band center of the band pass, and the latter functions according to remaining side modulation.

15. Method as recited in claim 14, characterized in that the upper part of the remaining side band is obtained by means of frequency conversion, from the by means of the filter ($P_1$) in the first filter branch, as a signal of the filter ($P_2$) in the second

filter branch, and generated as a lower side band between $\omega/2$ and $\omega$, and that the signal contains a Nyquist flank at $\omega_g$, which is filtered with a root Nyquist filter at $\omega_g$.

16. Method as recited in claim 7 or 8, characterized in that in the case of multi-carrier systems, the real and imaginary channels alternate and that this is done by means of RSB modulation with cosine and sine carriers, and that the division of the transmission channel into several frequency ranges takes place.

17. Method as recited in claim 16, characterized in that the Nyquist flanks are made smaller, as desired, at the carrier frequencies, in order to reduce the in-channel square cross-talk.

18. Method as recited in claim 1, characterized in that the transmitter-side RSB filters are shifted into the basic band and the signals are broken down into an even portion ($H_g(j\omega)$) and an odd portion ($H_u(j\omega)$), and the odd portion ($H_u(j\omega)$) is multiplied by j to restore a real time function ($jH_u(j\omega)$), before a conversion by means of a cosine carrier and a sine carrier takes place, and that the two portions are added or subtracted.

19. Method as recited in claim 18, characterized in that the flank of the even portion ($H_g(j\omega)$) is designed as a root Nyquist flank and that on the reception side, the higher frequency portions that occur during demodulation are suppressed by means of simple low-pass filters.

20. Method as recited in claim 18, characterized in that the cosine carrier and the sine carrier are interchanged for the implementation of imaginary transmission functions.

21. Transmitter for transmitting $Q^2$PSK or $Q^n$PSK signals, with switching arrangements for filtering and dividing as well as modulating the QPSK signals as recited in claim 1 or as recited in one of claims 2 to 12.

22. Receiver having a demodulator for the reception, processing, and recovery after the transmission steps as recited in claim 1 or QPSK signals generated as recited in one of claims 2 to 12.